FISKERIDIREKTORATETS SKRIFTER
Serie Havundersøkelser
(*Report on Norwegian Fishery and Marine Investigations*)
Vol. XII. No. 2.

The Herring from the Fuglsetfjord – a supplement to "The Østerbø Herring"

By
THOROLV RASMUSSEN

1958
A.S JOHN GRIEGS BOKTRYKKERI, BERGEN

Introduction

At the end of February 1953 a herring sample totalling 71 individuals from the Fuglsetfjord in Sogn on the Norwegian west coast was received at the Institute of Marine Research, Bergen. On a cursory examination this herring did not seem to represent anything extraordinary. As we had entered the latter half of the Winter Herring season, it seemed natural to regard the sample as being drawn from the ordinary herring population, but a closer investigation revealed that this was not the case.

The herring is found to be closely connected with the «Østerbø Herring» previously described by Aasen (1953).

I wish to thank Dr. William Hodgson and Mr. O. Aasen most cordially for reading over and amending the English text.

The Fuglsetfjord

The Fuglsetfjord is situated in the outer half of the Sognefjord (Fig. 1). In the bottom right corner of the figure is found an enlargement of the square drawn in on the smaller scale map. The cross indicates the place of capture of the herring treated in this paper.

The herring from the Fuglsetfjord

It is commen practise to distinguish between two growth types of the Norwegian Winter herring: the Southern and the Northern growth-type, according to the the scale characters. The Southern type has diffuse winter-rings while the Northern type has well defined, sharp winter-rings before going over the oceanic stage and these differences are explained as being due to rearing in southern or northern waters respectively (Lea 1929).

One of the more conspicuous features of the herring from the Fuglsetfjord was the peculiar growth type on the scales of the 1947

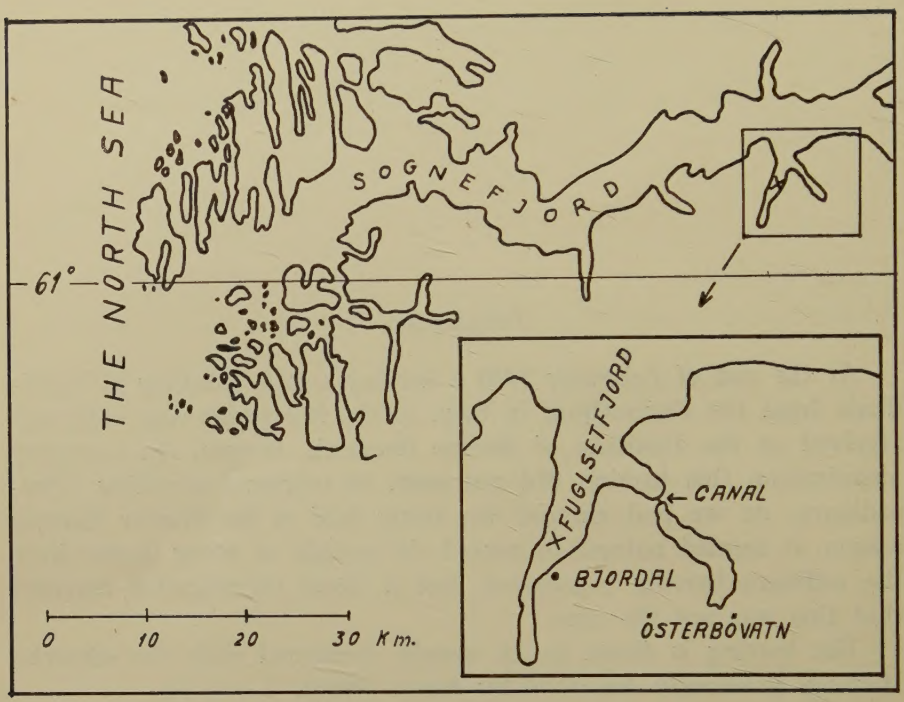


Fig. 1. The outer part of the Sognefjord with the Fuglsetfjord.

yearclass (6 year old herring). The three first rings of these scales were sharp and consequently they were of the type we have called Northern. So far there was a certain agreement with the Winter herring, but the actual growth-pattern on the scales differed. This is illustrated on the Plate where two scale-photos are shown: (a) herring from Fuglsetfjord and (b) Norwegian Winter herring (Northern type). These herrings are from the same year-class (the year-class 1947). It will be noticed that there is a striking difference in their growth histories. Compared to the Winter herring the herring from the Fuglsetfjord has a stronger growth in its second year, but in the third year the growth is very much smaller. In order to illustrate this further I have carried out growth measurements on the 6 years old herring in the sample (47 ind.) from the Fuglsetfjord, and a somewhat larger number Norwegian Winter herring (75 ind.) of the Northern type, the age being the same (Fig. 2).

These curves show better the growth-difference and confirm what has already been read out from the scale-photos: The growth-increment in the two first years is much larger for the herring from the Fuglsetfjord than that for the Winter herring. Also is clearly shown the abnormal

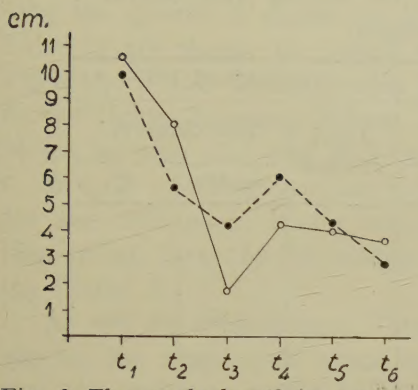


Fig. 2. The yearly length-increments of the year-class 1947 from the Fuglsetfjord (fully drawn line) and the Norwegian Winter herring, Northern type (broken line).

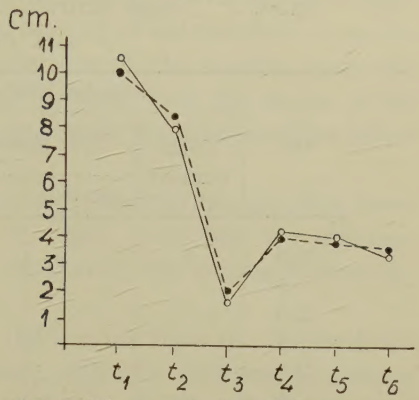


Fig. 3. The yearly length-increments of the year-class 1947 from the Fuglsetfjord (fully drawn line) and the Østerbø herring (broken line).

small increment in the third summer (t_3) of the first named type with only 1.7 cm in contrast to the t_3 of the Winter herring with 4.2 cm (average valued).

Where, then, does this herring originate? From a branch of the Fuglsetfjord (Fig. 1) there is a canal leading into a lake, the Østerbøvatn. This canal, which connects this «poll» with the fjord, is shallow and narrow, about 2 m deep and 5 m wide (at high tide). From the canal and inwards the bottom drops down to about 90 m and appears to be fairly even along the deepest part towards the end of the lake. This «poll» was investigated in 1951 and 1952 by Aasen (1953). As I had the scales of the herring from the Østerbøvatn fresh in memory, I thought I recognised the same pattern on the scales of the herring from the Fuglsetfjord, and by closer comparison this was confirmed

Tabel 1. *The age distributions of the herring from Østerbø and Fuglsetfjord.*

Year-class		1950	1949	1948	1947	1946	1945	
Østerbø 24-27 X 1952	Age.....	2+	3+	4+	5+	6+	7+	Total
	Number....	5	14	43	137	—	1	200
	%.....	2.5	7.0	21.5	68.5	—	0.5	100.0
Fuglsetfjord 28 II 1953	Age.....	3	4	5	6	7	8	
	Number....	2	8	14	41	1	—	66
	%.....	3.0	12.1	21.2	62.2	1.5		100.0

Tabel 2. *Length distribution of the herring from Østerbø and Fuglsetfjord.*

cm	Østerbø 1952			Fuglsetfjord 1953		
	Total number	Year class 1947		Total number	Year class 1947	
		number	%		number	%
21.0	1					
.5						
22.0						
.5						
23.0						
.5	1					
24.0	2					
.5	—					
25.0	1					
.5	1					
26.0	2					
.5	1					
27.0	—					
.5	—					
28.0	2			2		
.5	3			1		
29.0	6			3		
.5	5			4		
30.0	12	5	3.7	4	2	4.9
.5	22	9	6.6	3	1	2.4
31.0	52	24	17.5	10	5	12.2
.5	53	20	14.5	15	10	24.4
32.0	92	40	29.2	20	15	36.6
.5	71	24	17.5	5	5	12.2
33.0	32	10	7.3	2	2	4.9
.5	11	3	2.2	2	1	2.4
34.0	4	2	1.5	—	—	—
.5	1	—	—	—	—	—
Total	375	137	100.0	71	41	100.0

(See Plate, Aasen 1953). In Fig. 3 are shown the yearly increments of the 1947 year-class of the Østerbø herring and the herring from the Fuglsetfjord. The curves are practically identical and furnish strong evidence in favour of the assumption that one here is dealing with herring from the same population.

In Tabel 1 are shown the age distributions of the Østerbø herring and the herring from the Fuglsetfjord. One will notice that the distributions are very nearly the same and here again one has evidence that the herrings are similar.

The herring from the Fuglsetfjord is rather large for its age and regarding the growth it equals the Winter herring of the Southern type. In Tabel 2 are shown the length distributions of the herring from the Fuglsetfjord and from Østerbø. It will be seen that the length of the former ranges between 28.0 and 33.5 cm., while the length of the latter varies between 21.5 and 34.5 cm.

Broadly speaking there are similarities in the distributions, but there are also differences. If, for instance, the 1947 year-class (the dominating group) from the two samples are compared, the similarity is striking (Tabel 2).

As will be evident from Tabel 3, the herring from the Fuglsetfjord was in the stages just before spawning, and one may safely assume that the spawning would have taken place in the month of March as 92 % were in Stage V (the stage-index for spawning herring is VI). In Tabel 3 is also entered the distribution of the maturity stages of the Østerbø herring in October the previous autumn. As will be seen, the stages of the herring from the Fuglsetfjord may well be regarded as a continuation of the stages of the Østerbø herring, which, according to Aasen (1953) spawns in March. This is in good agreement with the maturity stages of the herring from the Fuglsetfjord at the end of February.

Conclusion

From what has been shown on the preceding pages one may be justified in concluding that the Østerbø herring and the herring from the Fuglsetfjord are identical.

Strangely enough, this herring tribe is composed of both Southern and Northern types in spite of the fact that it seems to have a very restricted living space. At the present I am not prepared to offer any opinion as to the causes of this feature.

According to the stages of maturity, there seems to have taken place a spawning migration from the Østerbøvatn to the Fuglsetfjord, but presumably it has happened quite by chance that a shoal of fish has found its way through the canal. In this connection it is worth noticing that the herring from the Fuglsetfjord where all sexually mature while the Østerbø herring comprises immature fish as well. If the Fuglsetfjord had been the real «home» then it would have seemed more natural if the young herring were found there.

As mentioned before, I found that the scale of the herring from the Fuglsetfjord (the year-class 1947) showed Northern characters and for this reason I have used the corresponding type (and year-class) of the Norwegian winter herring for comparison.

Tabel 3. *Maturity stage of the herring from Østerbø and Fuglsetfjord.*

	Stage	I	II	VIII	III	IV	V	VI	VII	Total
Østerbø	Number	3	1	5	44	145				198
24-27 X 1952	%	1.5	0.5	2.5	22.3	73.3				100
Fuglsetfjord	Number				1	4	64	1	1	71
28 II 1953	%				1.4	5.6	90.2	1.4	1.4	100

Aasen (1953) has chosen to compare the Østerbø herring with the Southern growth type of the Norwegian Winter herring. However, both types are equally well suited for the purpose as they are both different from the Østerbø herring which, moreover, also comprise some Southern growth types.

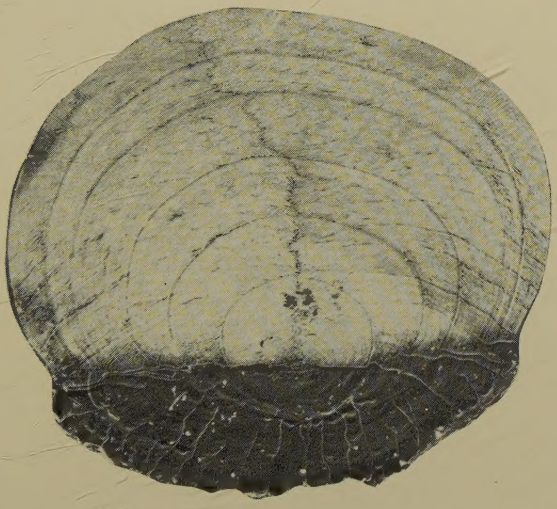
It may be argued that the Østerbøvatn is not necessarily the normal living ground for the tribe. One may advocate that the Fuglsetfjord is their real home and that the herring has entered from there into the Østerbøvatn. It is not easy at present to decide what is the correct answer to this question, but further investigations may give a solution. I am, however, inclined to regard the Østerbø herring as the main tribe, even if, a long time ago, it may, as ordinary Winter herring, have found its way into the «poll» where it has acclimatized itself and become a self contained tribe.

REFERENCES

Aasen, O., 1953. The Østerbø herring. *Rep. Norweg. Fish. Invest.*, 10 (7) : 1–34.

Lea, E., 1929. The herring scale as a certificate of origin. Its applicability to race investigations. *Rapp. Proc. Explor. Mer.*, 54 : 21–34.

a) 6 year-old herring from Fuglsetfjorden (year-class 1947)



b) 6 year-old Winter herring (year-class 1947)